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L2: Entry 2 of 2 File: DWPI Jun 19, 1998

DERWENT-ACC-NO: 1998-404821
DERWENT-WEEK: 199836

TITLE: Nozzle identification method for electronic component mounting apparatus - involves regulating nozzle movement by controller which recognises identifier of nozzle for end position detection

PRIORITY-DATA: 1996JP-0315728 (November 27, 1996)

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PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 10163690 A	June 19, 1998		015	H05K013/04

INT-CL (IPC): B23P 21/00; B25J 15/06; H05K 13/04; H05K 13/08

ABSTRACTED-PUB-NO: JP 10163690A
BASIC-ABSTRACT:

The method involves irradiating light on a cylindrical nozzle (2), using a light source (15). The nozzle which is perpendicularly positioned at the rear side of the mounting head through an attachment shaft, is detected by a detector. The nozzle is moved in longitudinal axial direction between the light emitting body and a light receiving body (60), for recognising the image of a detection object (S) held by the nozzle.

The starting point (Sa) of detection object is detected based on obtained image which is set as a standard point. The nozzle is again moved along longitudinal axial direction for detecting termination of the detection object. The nozzle movement is regulated by a controller which recognises an identifier of the nozzle for end position detection.

ADVANTAGE - Offers attachment of variety of nozzle to mounting head simply and reliably.

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L2: Entry 1 of 2 File: JPAB Jun 19, 1998

PUB-NO: JP410163690A
DOCUMENT-IDENTIFIER: JP 10163690 A
TITLE: COMPONENT MOUNTING APPARATUS, AND NOZZLE IDENTIFYING METHOD IN THE APPARATUS

PUBN-DATE: June 19, 1998

INVENTOR-INFORMATION:

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INT-CL (IPC): H05K 13/04; B23P 21/00; B25J 15/06; H05K 13/08

ABSTRACT:

PROBLEM TO BE SOLVED: To identify the kinds of nozzle simply, surely, and quickly, by forming the sensing body of a nozzle out of sensing-start and sensing-end reference elements provided in the nozzle and nozzle identifiers provided between these sensing reference elements.

SOLUTION: As projecting a laser beam on a nozzle 2, a mounting head is moved in a longitudinal axis direction to sense a sensing reference element Sa. Then, moving the nozzle 2 in the longitudinal axis direction at an equal pitch (h), a plurality of nozzle identifiers S1, S2, S3, S4 are sensed in succession. Further, moving the nozzle 2, a recessed groove S2 of the nozzle identifier S2 is recognized as a code [1]. In this way, sensing the presences of the recessed grooves for the subsequent nozzle identifiers S3, S4, one of codes [0], [1] is obtained for each nozzle identifier. Then, when sensing a sensing-end reference element Sb, an identifying code is completed. Thereby, the nozzle 2 is judged as an identifying code [0101] by using its sensing body S to confirm the attachment of the desired nozzle 2.

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CLAIMS

[Claim(s)]

[Claim 1] The wearing head prepared free [movement on the body], and the nozzle for part adsorption perpendicularly prepared in this wearing head bottom free [rotation] through the attachment shaft, Make the detection means which this nozzle was made to correspond and was established, and the detection object detected by the light which it prepares in said nozzle and said detection means irradiates have, and [said detection object] With a standard child and the end standard child of detection at the beginning of these detection at the beginning of detection prepared for the upper part and Shimobe to the direction of a vertical axis of the nozzle which consists of this diameter of the same between a standard child and the end standard child of detection Consist of a nozzle identifier prepared in one piece or the direction of a vertical axis, and [two or more / these standard child] It is part wearing equipment characterized by being one of the processing object which formed these nozzle identifier in the perimeter of a nozzle, combination with the real cylindrical part to which this processing object is not given at all or a processing object, and the real cylindrical [are the processing object formed in the perimeter of a nozzle, and] parts.

[Claim 2] The wearing head prepared free [movement on the body], and the nozzle for part adsorption perpendicularly prepared in this wearing head bottom free [rotation] through the attachment shaft, Make the detection means which this nozzle was made to correspond and was established, and the detection object detected by the light which it prepares in said nozzle and said detection means irradiates have, and [said detection object] With one standard child who prepared in either the upper part or the lower part to the direction of a vertical axis of the nozzle which consists of this diameter of the same Become down [of this standard child / above or down] from the nozzle identifier prepared in one piece or the direction of a vertical axis, and [two or more / this standard child] It is part wearing equipment characterized by being one of the processing object which formed these nozzle identifier in the perimeter of a

nozzle, combination with the real cylindrical part to which this processing object is not given at all or a processing object, and the real cylindrical [are the processing object formed in the perimeter of a nozzle, and] parts.

[Claim 3] The wearing head prepared free [movement on the body], and the nozzle for part adsorption perpendicularly prepared in this wearing head bottom free [rotation] through the attachment shaft, Make the detection means which this nozzle was made to correspond and was established, and the detection object detected by the light which it prepares in said nozzle and said detection means irradiates have, and [said detection object] Become the nozzle which consists of this diameter of the same from a preparing-in one-piece or direction of vertical axis-more than one nozzle identifier, and [these nozzle identifier] Part wearing equipment characterized by being one of the processing object formed in the perimeter of a nozzle, combination with the real cylindrical part which does not give this processing object at all or a processing object, and the real cylindrical parts.

[Claim 4] The standard child and nozzle identifier of a detection object are part wearing equipment Claim 1, 2, or given in three characterized by preparing each in either at equal intervals or non-at equal intervals to the direction of a vertical axis of a nozzle.

[Claim 5] The Claim 1 **** characterized by having prepared in the arbitrary position up and down, and the standard child of a detection object preparing in the arbitrary position of its upper and lower sides between these nozzle identifiers in the direction of a vertical axis of a nozzle when [of this nozzle identifier] a nozzle identifier is plurality when the number of nozzle identifiers is one is part wearing equipment given in two.

[Claim 6] The processing object of a detection object is part wearing equipment Claim 1, 2, or given in three characterized by being either the concave made to engrave on the predetermined depth which continues to the whole perimeter part of a nozzle, or the through-holes which were made to penetrate.

[Claim 7] The processing object of a detection object is part wearing equipment Claim 1, 2, or given in three characterized by being the concave which made a part of perimeter part of the nozzle excise.

[Claim 8] Two or more processing objects of a detection object are part wearing equipment according to claim 1 or 2 characterized by being the concave which made two or more places excise a part of perimeter part of a nozzle to up to the direction of the same circumference.

[Claim 9] Two or more processing objects of a detection object are part wearing equipment which is given [Claim 1 characterized by being the concave which changed and prepared this cut depth or 2, 3, 6 and 7, or given in eight].

[Claim 10] Detection light is irradiated toward a tubed nozzle from the photogen in a detection means. Are in the part wearing equipment which receives light with a light-receiving object and identifies a nozzle in a control means based on this read picture, and detection light is

irradiated from a photogen to the nozzle attached to the attachment shaft of a wearing head. When a standard child is detected at the beginning of detection prepared in this nozzle, until it detects the end standard child of detection, moving a nozzle in the direction of a vertical axis by making a standard child into the starting point at this beginning of detection Two or more set Mino nozzle identifier which consists of one nozzle identifier or processing object which consists of the processing object or real cylinder part which inputted into the control means beforehand and was made to code, a real cylinder part, or either is detected. The nozzle discernment method in the part wearing equipment characterized by identifying a nozzle with this data.

[Claim 11] Detection light is irradiated toward a tubed nozzle from the photogen in a detection means. Are in the part wearing equipment which receives light with a light-receiving object and identifies a nozzle in a control means based on this read picture, and detection light is irradiated from a photogen to the nozzle attached to the attachment shaft of a wearing head. When a standard child is detected at the beginning of detection prepared in this nozzle, a standard child is made into the starting point at this beginning of detection. Two or more set Mino nozzle identifier which consists of one nozzle identifier or processing object which consists of the processing object or real cylinder part which inputted into the control means beforehand and was made to code, a real cylinder part, or either is detected moving a nozzle in the direction of a vertical axis. The nozzle discernment method in the part wearing equipment characterized by identifying a nozzle with this data.

[Claim 12] Detection light is irradiated toward a tubed nozzle from the photogen in a detection means. Are in the part wearing equipment which receives light with a light-receiving object and identifies a nozzle in a control means based on this read picture, and detection light is irradiated from a photogen to the nozzle attached to the attachment shaft of a wearing head. Two or more set Mino nozzle identifier which consists of one nozzle identifier or processing object which consists of the processing object or real cylinder part which inputted into the control means beforehand and was made to code, a real cylinder part, or either is detected moving a nozzle in the direction of a vertical axis. The nozzle discernment method in the part wearing equipment characterized by identifying a nozzle with this data.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is in adsorption maintenance and wearing of parts, and relates to the nozzle discernment method in the part wearing equipment and part wearing equipment which can ensure simply detection of the kind of nozzle attached to the head at high speed.

[0002]

[Description of the Prior Art] [the electronic-parts mounting machine used in the industries, such as an assembly of electronic parts,] Loading of electronic parts and the assembly for which it wishes to a printed circuit board are made because the adsorption nozzle of various sizes or form is attached to the head made to engage with XY table free [attachment and detachment] and this nozzle moves a part supply position and a loading position to it arbitrarily according to the parts which should be mounted.

[0003] It becomes indispensable to deal with the electronic parts with which it equips surely, and the nozzle attached to the head is beforehand checked before part adsorption.

[0004] The light-emitting part with which this check work irradiates light from the side of a nozzle conventionally, for example, It has been arranged in the position which counters on both sides of a nozzle to this light-emitting part, and laser light was glared and detected to the perimeter part (diameter part) of the nozzle attached to the head using the optical sensing device which consists of a light sensing portion which receives the light which the light-emitting part irradiated. (Refer to JP,H7-183694,A)

However, it is this thing's having measured the diameter of the nozzle with this optical sensing device, and having made it comparison-operation-input as data beforehand. Since the actually measured nozzle kind was judged, when an error occurred in Measurement Division of the diameter of a nozzle with the error by the reaction of the sensor when rotating dispersion and the nozzle of laser light etc., it was what has a big problem with a possibility that the mistaken judgment may be performed.

[0005]

[Problem to be solved by the invention] When a standard child or the first code is detected at the beginning of detection which was made in order that this invention might solve the above mentioned problem, irradiated detection light toward the cylindrical nozzle from the photogen of the detection means, and was prepared in the nozzle, Until it detects the code of the end standard child of detection, or the last one by one, moving a nozzle in the direction of a vertical axis by making a standard child into the starting point at this beginning of detection By receiving two or more set Mino nozzle identifier which consists of a processing object which inputted into the control means beforehand and was made to code, and a real cylinder part with a light-receiving object, reading this picture, and identifying a nozzle by a control means It aims at offering the nozzle discernment method in the part wearing equipment and part wearing equipment which can perform the kind of nozzle attached to the wearing head simply and certainly, and at high speed.

[0006]

[Means for solving problem] [the means of this invention for attaining the above mentioned purpose] The wearing head prepared free [movement on the body], and the nozzle for part

adsorption perpendicularly prepared in this wearing head bottom free [rotation] through the attachment shaft, Make the detection means which this nozzle was made to correspond and was established, and the detection object detected by the light which it prepares in said nozzle and said detection means irradiates have, and [said detection object] With a standard child and the end standard child of detection at the beginning of these detection at the beginning of detection prepared for the upper part and Shimobe to the direction of a vertical axis of the nozzle which consists of this diameter of the same between a standard child and the end standard child of detection Consist of a nozzle identifier prepared in one piece or the direction of a vertical axis, and [two or more / these standard child] It is the processing object formed in the perimeter of a nozzle, and these nozzle identifier is in the composition of the part wearing equipment which is one of the processing object formed in the perimeter of a nozzle, combination with the real cylindrical part which does not give this processing object at all or a processing object, and the real cylindrical parts.

[0007] The wearing head prepared free [movement on the body], and the nozzle for part adsorption perpendicularly prepared in this wearing head bottom free [rotation] through the attachment shaft, Make the detection means which this nozzle was made to correspond and was established, and the detection object detected by the light which it prepares in said nozzle and said detection means irradiates have, and [said detection object] With one standard child who prepared in either the upper part or the lower part to the direction of a vertical axis of the nozzle which consists of this diameter of the same Become down [of this standard child / above or down] from the nozzle identifier prepared in one piece or the direction of a vertical axis, and [two or more / this standard child] It is the processing object formed in the perimeter of a nozzle, and these nozzle identifier is in the composition of the part wearing equipment which is one of the processing object formed in the perimeter of a nozzle, combination with the real cylindrical part which does not give this processing object at all or a processing object, and the real cylindrical parts.

[0008] The wearing head prepared free [movement on the body], and the nozzle for part adsorption perpendicularly prepared in this wearing head bottom free [rotation] through the attachment shaft, Make the detection means which this nozzle was made to correspond and was established, and the detection object detected by the light which it prepares in said nozzle and said detection means irradiates have, and [said detection object] Become the nozzle which consists of this diameter of the same from a preparing-in one-piece or direction of vertical axis-more than one nozzle identifier, and [these nozzle identifier] It is in the composition of the part wearing equipment which is one of the processing object formed in the perimeter of a nozzle, combination with the real cylindrical part which does not give this processing object at all or a processing object, and the real cylindrical parts.

[0009] The standard child and nozzle identifier of a detection object are prepared to the

direction of a vertical axis of a nozzle in either at equal intervals in each, or non-at equal intervals.

[0010] In the direction of a vertical axis of a nozzle, the standard child of a detection object prepares in the arbitrary position of its upper and lower sides between these nozzle identifiers, when [of this nozzle identifier] the number of nozzle identifiers is one, and it prepares in an arbitrary position up and down and a nozzle identifier is plurality.

[0011] The processing object of a detection object is either the concave made to engrave on the predetermined depth which continues to the whole perimeter part of a nozzle, or the through-holes which were made to penetrate.

[0012] The processing object of a detection object is the concave which made a part of perimeter part of the nozzle excise.

[0013] Two or more processing objects of a detection object are the concaves which made two or more places excise a part of perimeter part of a nozzle to up to the direction of the same circumference.

[0014] Two or more processing objects of a detection object are the concaves which changed and prepared this cut depth.

[0015] And detection light is irradiated toward a tubed nozzle from the photogen in a detection means. Are in the part wearing equipment which receives light with a light-receiving object and identifies a nozzle in a control means based on this read picture, and detection light is irradiated from a photogen to the nozzle attached to the attachment shaft of a wearing head. When a standard child is detected at the beginning of detection prepared in this nozzle, until it detects the end standard child of detection, moving a nozzle in the direction of a vertical axis by making a standard child into the starting point at this beginning of detection Two or more set Mino nozzle identifier which consists of one nozzle identifier or processing object which consists of the processing object or real cylinder part which inputted into the control means beforehand and was made to code, a real cylinder part, or either is detected, and it is in the nozzle discernment method in the part wearing equipment which identifies a nozzle with this data.

[0016] Moreover, detection light is irradiated toward a tubed nozzle from the photogen in a detection means. Are in the part wearing equipment which receives light with a light-receiving object and identifies a nozzle in a control means based on this read picture, and detection light is irradiated from a photogen to the nozzle attached to the attachment shaft of a wearing head. When a standard child is detected at the beginning of detection prepared in this nozzle, a standard child is made into the starting point at this beginning of detection. Two or more set Mino nozzle identifier which consists of one nozzle identifier or processing object which consists of the processing object or real cylinder part which inputted into the control means beforehand and was made to code, a real cylinder part, or either is detected moving a nozzle

in the direction of a vertical axis. It is in the nozzle discernment method in the part wearing equipment which identifies a nozzle with this data.

[0017] Furthermore, detection light is irradiated toward a tubed nozzle from the photogen in a detection means. Are in the part wearing equipment which receives light with a light-receiving object and identifies a nozzle in a control means based on this read picture, and detection light is irradiated from a photogen to the nozzle attached to the attachment shaft of a wearing head. One nozzle identifier which consists of the processing objects or real cylinder parts which inputted into the control means beforehand and were made to code moving a nozzle in the direction of a vertical axis, Or two or more set Mino nozzle identifier which consists of a processing object, a real cylinder part, or either is detected, and it is in the nozzle discernment method in the part wearing equipment which identifies a nozzle with this data.

[0018]

[Working example] Next, one working example of the nozzle discernment method in the part wearing equipment and part wearing equipment about this invention is explained based on Drawings.

[0019] In drawing 1 and drawing 2 , A is part wearing equipment, and receive the electronic parts b, such as chip parts and IC parts, from the feed section m, transport to the mounting part n, equip the predetermined number proper place on printed circuit board c, and The wearing head 1, It is fundamentally constituted by the attachment shaft 3 of a nozzle 2, the detection means 4, and the detection object S and the control means 6 that were prepared in the nozzle 2.

[0020] And the above mentioned wearing head 1 is attached to the attitude object 9 which moves to the body 7 arbitrarily in the direction of order by the attitude means 8, is prepared through the movable object 11 which moves to a horizontal direction arbitrarily by the transportation device 10, and is made engaged free [rise and fall] by the rise-and-fall means 12 to this movable object 11.

[0021] The above mentioned attachment shaft 3 is formed in the wearing head 1 bottom free [rotation] by the pivot means 13 focusing on the perpendicular direction (the direction of a vertical axis). It has attached free [attachment and detachment] so that the nozzle 2 which carries out adsorption maintenance of the electronic parts b by the negative pressure concerning the suction hole 2a can be suitably exchanged for the different-species nozzle 2 laid in the nearby nozzle switchboard 14.

[0022] In addition, each above mentioned means 8, and 10, 12 and 13 operate with high precision with the servomotor in which numerical control is possible.

[0023] The above mentioned detection means 4 is made to correspond to the nozzle 2 prepared in the attachment shaft 3. It is that as which it consists of the photogen 15 and the light-receiving object 16 which were established on both sides of this nozzle 2, and has fixed to

the proper place of the body 7, and a conventional laser unit etc. is adopted. The projection width of this nozzle 2, the position of the detection object S which carries out a postscript, direction, and a form are detected by receiving the laser which was not interrupted by the nozzle 2 in the light-receiving object 16 which consists of a CCD in parallel laser-beams R irradiated from the slit which has predetermined width in a photogen 15.

[0024] The above mentioned detection object S at the beginning of detection With the standard child Sa and the end standard child Sb of detection [with the laser light R which it consists of a nozzle identifier Sn, it prepares in cylindrical shape **** 2b of the nozzle 2 attached to the attachment shaft 3, and the photogen 15 of the detection means 4 irradiates] The projection width of cylindrical shape **** 2b of this nozzle 2 is detected, and this cylindrical shape **** 2b covers the direction abbreviation full length of an axis, and has a diameter of the same.

[0025] and -- the case where a standard child's fundamental composition in this detection object S has the standard child Sa and the end standard child Sb of detection at the beginning of ** detection, and the start standard child Sa of ** detection -- a case and ** -- it resembles the case where said standard child Sa who did, and Sb are not prepared, and is divided roughly.

[0026] Moreover, cylindrical shape **** 2b has the fundamental composition of the nozzle identifier Sn in this detection object S, and one case and when more than one are prepared to the direction of an axis, it is depended.

[0027] [the case where standard child composition is the aforementioned ** / the one example in case the nozzle (two standard children) identifier Sn is plurality] To the direction of a vertical axis of cylindrical shape **** 2b in a nozzle 2, prepare the upper part and Shimobe the standard child Sa and the end standard child Sb of detection at the beginning of detection, respectively, and at the beginning of these detection between the standard child Sa and the end standard child Sb of detection For example, as are shown in drawing 3 (a), and each shows regular intervals h and h, h--, or drawing 3 (b) in the direction of a vertical axis, the nozzle identifier S1 of a predetermined number, S2, S3, and S4 -- can be prepared so that it may become the non-regular intervals h, h1, and h--.

[0028] [moreover, the one example in case the number of the nozzle identifiers Sn is one] To the direction of a vertical axis of cylindrical shape **** 2b in a nozzle 2, prepare the upper part and Shimobe the standard child Sa and the end standard child Sb of detection at the beginning of detection, respectively, and at the beginning of these detection between the standard child Sa and the end standard child Sb of detection For example, as shown in drawing 4 (a), the simple substance of the nozzle identifier S1 is prepared, and it is not ****(ing) and illustrating, but it is prepared in the upper part of the standard child Sa and the end standard child Sb of detection, or a lower part at the beginning of these detection.

[0029] [moreover, the example in case the nozzle (one start standard child Sa of detection)

identifier Sn is plurality in the case where standard child composition is the aforementioned **] [the standard child Sa] to the direction of a vertical axis of cylindrical shape **** 2b in a nozzle 2 at the beginning of detection which detects the start of a code as shown in drawing 5 (a) As it prepares in the upper part, or it indicates drawing 5 (b) that the nozzle identifier Sn serves as a lower part, and prepares in the lower part or indicates drawing 5 (c) and (d) that the nozzle identifier Sn serves as the upper part, in the predetermined position between the nozzle identifiers Sn, it has prepared in the intermediate part.

[0030] [and the arrangement pattern of the nozzle identifier Sn] In the direction of a vertical axis in cylindrical shape **** 2b in a nozzle 2 as shown in drawing 5 (a), (b), and (c) As two or more nozzle identifiers S1, S2, S3, and S4 -- are prepared or it indicates drawing 5 (d) that each becomes regular intervals h and h and h--, two or more nozzle identifiers S1, S2, S3, and S4 -- are prepared so that each may become the non-regular intervals h, h1, and h--.

[0031] [moreover, the one example in case the number of the nozzle identifiers S1 is one] [as opposed to / the direction of a vertical axis of cylindrical shape **** 2b in a nozzle 2] as shown in drawing 4 (b) The nozzle identifier S1 is formed in the standard child's Sa lower part at the beginning of detection, or as shown in drawing 5 (c), the nozzle identifier S1 is formed in the standard child's Sa upper part at the beginning of detection, and these are set as the predetermined interval h.

[0032] furthermore, when standard child composition is the aforementioned ** (it does not have the standard child Sa and the end standard child Sb of detection at the beginning of detection) As are shown in drawing 8 (a), and each considers it as regular intervals h and h and h-- in the direction of a vertical axis or cylindrical shape **** 2b in a nozzle 2 is shown in drawing 6 (b), it becomes the composition of preparing only two or more nozzle identifiers S1, S2, S3, and S4 -- so that it may be set to the non-regular intervals h, h1, and h.

[0033] In addition, the standard child Sa and the end standard child Sb of detection set up the beginning of the operation from which a nozzle 2 is discriminated, and the last range by the detection means 4, and these are the datum points for code detection of a nozzle 2, and they are [these] equivalent to the starting point of code detection with these in the beginning [detection] in the aforementioned **.

[0034] [the nozzle identifier S1, S2, S3, and S4] [moreover,] The through-hole of the shape of a straight line which made the concave or the axial part 2b penetrate among the processing objects formed in the perimeter of a nozzle 2 by the coding for performing kind recognition of the actual nozzle 2, One of combination with the real cylindrical part which does not give this concave or through-hole at all, a concave or a through-hole, and the real cylindrical parts is adopted.

[0035] When [and] various composition of this detection object S is mentioned and is shown in drawing 3 and drawing 6 First, the continuous shape of a concave, the continuous shape of

cross-sectional positive circular which the processing object made engrave the standard child Sa and the end standard child Sb of detection on the predetermined depth at the beginning of detection Or as shown in drawing 5 (d), drawing 6 (b), and (c), it is formed in the straight line-like through-hole at an abbreviation level which made the axial part 2b penetrate. In nothing and drawing 3 (a), both the standard child Sa and Sb have the standard child Sa in cylindrical shape **** 2b at the beginning of detection, and prepare the same form in the Mogami side, and the end standard child Sb of detection is located in the lowest side.

[0036] [the nozzle identifier S1, S2, S3, and S4] [moreover,] In drawing 3 (a) and drawing 6 (a), it is prepared in the pitches [bottom / standard child Sa] h and h-- at the beginning of detection, and sets to drawing 3 (b) and drawing 6 (a). Although it is prepared in irregular pitch h and h1 --, and the real cylindrical part S1 and S3 in which a concave is not formed, and a concave S2 and S4 are not formed by turns and not being illustrated, you may make the axial part 2b of a nozzle 2 form in the through-hole made to penetrate in the shape of a straight line at an abbreviation level.

[0037] The above mentioned control means 6 is what is made to coordinate with the detection means 4, each above mentioned means 8, and 10, 12 and 13, and controls right and left before and after a nozzle 2, and an up-and-down position. A conventional computer is used, and the program required for part wearing is inputted beforehand, and [this control means 6] two or more nozzles 2 required for part loading -- to all, each information on the detection object S given to standard data and these nozzles 2, such as form of these nozzles 2 and a size, is inputted beforehand, takes in these signals by the detection means 4, and sends a predetermined detection result according to an operation with said information.

[0038] Therefore, an operation of the discernment method of the nozzle 2 of the first example with the detection object S as shown in drawing 3 (a) in the part wearing equipment A of this invention working example constituted as mentioned above is explained.

[0039] In addition, it is in the part wearing equipment A shown in drawing 1 and drawing 2 , and in order to adsorb the electronic parts b from a feed section m and to smoothly and certainly carry in printed circuit board c, you have to attach suitably the nozzle 2 suitable for adsorption of these electronic parts b to the attachment shaft 3 of the wearing head 1.

[0040] When [therefore,] it is necessary to exchange a nozzle 2 with change of loading parts The nozzle 2 attached to the attachment shaft 3 to the empty receiving part 14a is beforehand placed to the nozzle switchboard 14 in which the nozzle 2 of the predetermined kind is installed, the new nozzle 2 to wish is taken out, and it attaches to this attachment shaft 3.

[0041] It is what distinguishes whether it is the nozzle 2 which he wishes on the occasion of the next part loading to this newly attached nozzle 2. Applying the laser light R from the photogen 15 in the detection means 4 to a nozzle 2, as shown in drawing 2 , the wearing head 1 is moved to the direction of a vertical axis by the rise-and-fall means 12, and the standard child

Sa is detected at the beginning of detection.

[0042] Namely, as shown in drawing 7 (a), [the laser light R from a photogen 15] It glares to the concave which is the standard child's Sa processing object at the beginning of detection, and a shadow L1 is detected in the light-receiving object 16 by the laser light R which passed the concave, and the laser light R interrupted by cylindrical shape ****, and this signal is sent to the control means 6, and is recognized as data of a detection start.

[0043] Next, it moves by control in which the wearing head 1 2, i.e., a nozzle, was beforehand provided by the pitches [direction / of a vertical axis] h, h, and h, and h--. [the real circle cylinder-axis part S1 which detects two or more nozzle identifiers S1, S2, S3, and S4 one by one by the laser light R from a photogen 15, and does not have the concave (processing object) which is the nozzle identifier S1] As shown in drawing 7 (b), a shadow L0 is detected in the light-receiving object 16 by the laser light R interrupted by this real circle cylinder-axis part S1, and this signal is recognized as what is sent to the control means 6 and does not have a concave, and a code "0."

[0044] furthermore, [the concave S2 which is the adjacent following nozzle identifier S2] as a nozzle 2 is moved and it is shown in drawing 6 (a) [the laser light R from a photogen 15 / with the laser light R which it glares to the concave of this nozzle identifier S2, and passed the concave, and the laser light R interrupted by cylindrical shape **** 2b] A shadow L1 is detected in the light-receiving object 16, and this signal is recognized as what is sent to the control means 6 and has a concave, and a code "1."

[0045] Thus, to the following nozzle identifier S3 and S4, said non-** which has a concave by the detection means 4 similarly is detected, and a code "0" and a code "1" are obtained for each.

[0046] And it is what detection of an identification code ends when the rise-and-fall means 12 is operated, a nozzle 2 is moved further and the detection means 4 detects the end standard child Sb of detection. It is checked that the nozzle 2 shown in drawing 3 (a) in this example carried out the comparison operation with the identification code which it is distinguished that it is "0101" and is beforehand inputted into the control means 6, and the nozzle 2 which judges and wishes for a quality attached it, and it has been attached to a shaft 3 with that detection object S.

[0047] In addition, although are in this example, the standard child Sa was detected first at detection the beginning of the cylindrical shape **** 2b top in a nozzle 2, detection of the nozzle identifier S1, S2, S3, and S4 was performed and that discernment was performed by detecting the end standard child Sb of detection By this reverse operation, the standard child Sb is detected first at detection the beginning of the cylindrical shape **** 2b bottom in a nozzle 2. Even if it performs detection of the nozzle identifier S4, S3, S2, and S1 and finally performs the discernment by detecting the end standard child Sa of detection, the same

operation effect is demonstrated by performing electric processing of a setup of a program etc.

[0048] furthermore, the detection object S in this example is shown in drawing 7 (a) and (b) -- as -- that cross-sectional form -- right -- since it is circular Even if the laser light R is irradiated from which angle to these standard child Sa, Sb and an identifier S1, S2, S3, and S4, [these] If vertical-axis control is carried out being able to detect, namely, attaching a nozzle 2 to the wearing head 1, after the nozzle 2 had stopped so that the laser light R may strike upon the detection object S, discernment of a nozzle 2 is possible.

[0049] A code total is 2m if 0 is included, since according to this example the number of codes has a standard up and down when the number of identifiers is set to m. It is. When [in addition,] the standard child Sa who shows drawing 6 (b) and (c), and Sb are used A processing object forms the standard child Sa in the Mogami side of cylindrical shape **** 2b at the beginning of detection which is a concave, and the processing object is prepared in the intermediate part in the nozzle identifier which has the end standard child Sb of detection who is a straight line-like through-hole in four rows in cylindrical shape **** 2b.

[0050] This standard child Sa and the arrangement position pattern of Sb can be arbitrarily set up in cylindrical shape **** 2b, the upper and lower sides of the standard child Sa and Sb can also be prepared conversely, and the start of detection and the end are performed along with the program beforehand set as the control means 6.

[0051] In addition, what also has the composition of the standard child Sa and an identifier S1 the nozzle identifier S1 of the operation effect which one case is also a certain thing and the amount of information of coding of a nozzle 2 decreases as shown in drawing 4 , but is demonstrated is the same as that of the above mentioned example, and same is adopted.

[0052] Moreover, as the form (processing object) of the standard child Sa and an identifier S1 is also shown in each example in drawing 4 , it is made to form in the whole direction of the circumference of the perimeter part of a nozzle 2, or the concave which made that part engrave and excise, or the shape of a real cylinder this concave is not made to completely form in is used.

[0053] It is in this example, as shown in drawing 5 , even if it is only the standard child's Sa use at the beginning of detection, recognition of a nozzle 2 can be performed, as for this example, beforehand, it is set as the control means 6 and, as for required code data, a detection operation is performed along with that program.

[0054] And the standard child's Sa setting position is what may be prepared in the position of the cylindrical shape **** 2b throat which can set a nozzle 2 at the beginning of detection. If there is detection of the identifier after detecting the standard child Sa at the beginning of detection, detection of an identifier begins from the upper part of the direction of a vertical axis in a nozzle 2, for example, it moves, detecting toward a lower part in order, and it is ending

detection of the lowermost nozzle identifier S4, and the detection for discernment of a nozzle 2 is completed.

[0055] This operation order makes the control means 6 memorize that program beforehand, the above mentioned operation is mentioned in illustration, and, as for other patterns, it is needless to say that it can set up arbitrarily.

[0056] If it is in detection of the through-hole (Sb) of the shape of a side hole which was able to be opened in the shape of [that] a straight line in this standard child As shown in drawing 6 (c), the position (concave prepared in the perimeter of the nozzle 2 part) of the direction and detection start side of the direction of the circumference of each identifier to the detection means 6 etc. is decided by carrying out rotation control of the nozzle 2 so that this through-hole inside may be parallel to the laser light R which passes through the inside of a straight line-like through-hole.

[0057] Moreover, when shown in drawing 8 , it becomes the example which does not form the standard child Sa and the end standard child Sb of detection in a nozzle 2 at the beginning of detection is shown, and simple [coding], but search of a nozzle identifier has a time loss as compared with the case where it has a standard child, and it is in the tendency for corresponding movement nature to fall as a detection operation.

[0058] And in order that its composition and operation may discriminate the kind of this nozzle 2 from the code of the nozzle 2 which the laser light R in the detection means 4 is made to correspond to direct nozzle identifier S1 --, and is detected, the table which the kind and code of a nozzle 2 contrast is beforehand inputted into the control means 6.

[0059] And it is what the example shown in drawing 8 (a) moves a nozzle 2 to the pitches [direction / of a vertical axis] h, h, and h, and h--, and detects two or more nozzle identifiers S1, S2, S3, and S4 one by one by the laser light R from a photogen 15. [the real circle cylinder-axis part S1 which does not have the concave (processing object) which is the nozzle identifier S1] As shown in drawing 7 (b), a shadow L0 is detected in the light-receiving object 16 by the laser light R interrupted by this real circle cylinder-axis part S1, and this signal is recognized as what is sent to the control means 6 and does not have a concave, and a code "0."

[0060] furthermore, [a nozzle 2 / move and / the concave S2 which is the adjacent following nozzle identifier S2] The laser light R from a photogen 15 is that from which a shadow is detected in the light-receiving object 16 by the laser light R which it glares to the concave of this nozzle identifier S2, and passed the concave, and the laser light R interrupted by cylindrical shape **** 2b. This signal is recognized as what is sent to the control means 6 and has a concave, and a code "1."

[0061] Thus, to the following nozzle identifier S3 and S4, said non-** which has a concave by the detection means 4 similarly is detected, and a code "0" and a code "1" are obtained for

each.

[0062] And it is what detection of an identification code ends when the rise-and-fall means 12 is operated, a nozzle 2 is moved further and the detection means 4 detects the end standard child Sb of detection. It is checked that the nozzle 2 shown in drawing 6 in this example carried out the comparison operation with the identification code which it is distinguished that it is "0101" and is beforehand inputted into the control means 6, and the nozzle 2 which judges and wishes for a quality attached it, and it has been attached to a shaft 3 with that detection object S.

[0063] In addition, if it is in the example shown in drawing 8 (b), it is in cylindrical shape **** 2b, and the nozzle identifier S1, S2, and S3 are prepared in the non-regular intervals h, h1, and h, and they are done so like [the operation effect of this example] said example.

[0064] Next, the detection object S given to the nozzle 2 which consists of composition shown in drawing 9 and drawing 10 is described.

[0065] At the beginning of detection in this detection object S [the standard child Sa and the end standard child Sb of detection] A part of perimeter part of the nozzle 2 is formed in the shape of [of the predetermined depth which made a part of perimeter part of this nozzle 2 excise in the shape of a straight line] a concave, both the standard child Sa and Sb have the standard child Sa in cylindrical shape **** 2b, and prepare the same form in the Mogami side at nothing and the beginning of detection, and the end standard child Sb of detection is located in the lowest side.

[0066] Moreover, the nozzle identifier S1, S2, and S3 are prepared in the pitches [bottom / standard child Sa] h and h-- at the beginning of detection, and the concave S2 (S1) of the predetermined depth which made a part of real cylindrical part S3 (S1) which does not have a concave, and perimeter part of the nozzle 2 excise in the shape of a straight line is formed in alternation or predetermined arrangement.

[0067] If it is in detection of this detection object S, as shown in drawing 10 , by the detection means 4 [the laser light R from a photogen 15] [with the laser light R which it glares to the concave of these standard child Sa, Sb and the nozzle identifier S1, S2, and S3, and a real cylindrical part, and passed the concave and the real cylindrical part, and the laser light R interrupted by cylindrical shape ****] Shadow Ln-- is detected in the light-receiving object 16, and this signal is sent to the control means 6, and is recognized as code data.

[0068] [the above mentioned nozzle identifier S1, S2, and S3] [moreover,] As drawing 11 is shown in each figure, in cylindrical shape **** 2b, not to mention the form of a real cylindrical part, it is not prepared in the direction of the circumference with equiangularity 90 degrees of every rotation angles at four places, and is not illustrating, but you may form in polygons other than the quadrangle described above as other examples.

[0069] The real cylindrical part which does not have a concave at all is formed, and this

composition is recognized by the shadow detected by the detection means 4 as mentioned above in the code "0000" and the control means 6 which it does not have a concave at all, for example, as this figure is shown in (a).

[0070] When [moreover,] the concave formed in one left-hand side when shown in (b) is detected and a code "0001" is shown in (c) When the concave formed in the one bottom is detected and a code "0010" is shown in (d) When the concave formed in one right-hand side is detected and a code "0100" is shown in (e) When the concave formed in the one bottom is detected and a code "1000" is shown in (f), the concave formed in every 90-degree four places is detected, each is detected and a code "1111" is recognized in the control means 6.

[0071] In an every 90 degrees rotation phase, if what serves as the foundation of code recognition according to this example does not detect a concave and it detects a concave for "0", it will recognize "1."

[0072] Therefore, an operation of the discernment method of the nozzle 2 of the second example with the detection object S as shown in drawing 11 in the part wearing equipment A of this invention working example constituted as mentioned above is explained.

[0073] This example is the way you rotate a nozzle 2 by the pivot means 13, make it go up and down a nozzle 2 with a rise-and-fall means, and the detection means 4 detects the detection object S.

[0074] In addition, it is in part wearing equipment A, and since the nozzle 2 move operation attached to the attachment shaft 3 of the wearing head 1 is the same as that of the first above mentioned example, explanation of details is omitted.

[0075] First, applying the laser light R to a nozzle 2, and rotating from the photogen 15 in the detection means 4, as shown in drawing 8 , the standard child Sa is detected at the beginning of detection, this signal is sent to the control means 6, and it is made to recognize as data of a detection start.

[0076] Next, it is what moves a nozzle 2 to the pitches [direction / of a vertical axis] h, and h--, and rotates this nozzle 2, and detects two or more nozzle identifiers S1, S2, and S3 one by one by the laser light R from a photogen 15. as a result, [the nozzle identifier S1 in (a)] as shown in drawing 12 [a code "1000" / the nozzle identifier S2 in (b)] [a code "1001" / the nozzle identifier S3 in (c)] [the nozzle 2 which detection of an identification code ends and is shown in drawing 9 in this example] when the code "0000" is recognized and the detection means 4 detects the end standard child Sb of detection It is checked that the comparison operation was carried out with the identification code which it is distinguished that it is "100010010000" and is beforehand inputted into the control means 6 by the detection object S, the nozzle 2 which judges and wishes for a quality attached, and it has been attached to a shaft 3.

[0077] In addition, even if it is in this example, the standard child Sb is detected first at

detection the beginning of the cylindrical shape **** 2b bottom in a nozzle 2. Even if it performs detection of the nozzle identifier S3, S2, and S1 and finally performs the discernment by detecting the end standard child Sa of detection, of course, the same operation effect is demonstrated by performing electric processing.

[0078] A code total is 2 m+n when 0 is included, since according to this example there is a standard up and down about the number of identifiers when m and the one number of codes are set to n. It is. Next, the detection object S given to the nozzle 2 which consists of composition shown in drawing 13 - drawing 15 is described.

[0079] At the beginning of detection in this detection object S [the standard child Sa and the end standard child Sb of detection] A part of perimeter part of the nozzle 2 is formed in the shape of [of the predetermined depth which made a part of perimeter part of this nozzle 2 excise in the shape of a straight line] a concave, both the standard child Sa and Sb have the standard child Sa in cylindrical shape **** 2b, and prepare the same form in the Mogami side at nothing and the beginning of detection, and the end standard child Sb of detection is located in the lowest side.

[0080] [the nozzle identifier S1, S2, S3, and S4] [moreover,] As it is prepared in the pitches [bottom / standard child Sa] h and h-- at the beginning of detection and is shown in drawing 13 The concaves S2-S4 covering two or more kinds in the cut depth which made a part of real cylindrical part S1 in which the concave which is a processing object is not formed, and perimeter part of the nozzle 2 excise in the shape of a straight line are formed in alternation or predetermined arrangement.

[0081] If it is in detection of this detection object S, as shown in drawing 14 , by the detection means 4 [the laser light R from a photogen 15] It is what is irradiated to the concave of these standard child Sa, Sb and the nozzle identifier S1, S2, and S3, and a real cylindrical part. Distance Pn-- during laser light R radiation when this irradiated laser light R hits perpendicularly to a concave recess surface or a real cylindrical aspect is detected, and this signal is sent to the control means 6, and is recognized as code data.

[0082] [this composition], for example when shown in (a) and (f) in drawing 15 When the standard child Sa and Sb are detected, and the distance P2 during laser light R radiation is acquired and it is shown in (b), the real cylindrical part which does not have a concave at all is formed, the distance P0 during laser light R radiation is acquired, and it is recognized in the code "000" and the control means 6 which it does not have a concave at all.

[0083] moreover, the case where it is shown in (c) -- detection -- [the concave formed a little more deeply at first than the concave depth of the standard child Sa and the end standard child Sb of detection / detect and] When the distance P3 during laser light R radiation is acquired and a code "001" is shown in (d) The concave formed a little more shallowly than the concave depth of the start standard child Sa of detection and the end standard child Sb of

detection is detected. When the distance P1 during laser light R radiation is acquired and a code "100" is shown in (e) The concave formed identically to the concave depth of the start standard child Sa of detection and the end standard child Sb of detection is detected, the distance P2 during laser light R radiation is acquired, each is detected and a code "010" is recognized in the control means 6.

[0084] Being in these nozzle identifier S1, S2, S3, and S4, the distance during each laser radiation makes the concave depth set up so that it may be set to P3>P2>P1>P0.

[0085] Therefore, an operation of the discernment method of the nozzle 2 of the third example with the detection object S as shown in drawing 13 in the part wearing equipment A of this invention working example constituted as mentioned above is explained.

[0086] This example is the way make it go up and down a nozzle 2 with the rise-and-fall means 12, and rotate a nozzle 2 by the pivot means 13, apply the laser light R by the detection means 4 to a detector plane to a detector plane, and the distance difference during that laser light radiation detects the detection object S.

[0087] In addition, it is in part wearing equipment A, and for a start which described above the nozzle 2 move operation attached to the attachment shaft 3 of the wearing head 1, since it is the same as that of two examples, explanation of details is omitted.

[0088] First, if a part of concave is detected applying the laser light R to a nozzle 2, and rotating from the photogen 15 in the detection means 4, as shown in drawing 14 The rotation angle of a nozzle 2 is united, the standard child Sa is detected at this beginning of detection so that the distance during laser radiation may turn into the distance P2 beforehand set as the control means 6 from this concave recess surface, this signal is sent to the control means 6, and it is made to recognize as data of a detection start.

[0089] Next, it is what moves a nozzle 2 to the pitches [direction / of a vertical axis] h, and h--, and rotates this nozzle 2, and detects two or more nozzle identifiers S1, S2, S3, and S4 one by one by the laser light R from a photogen 15. as a result, [the nozzle identifier S1 in (b)] as shown in drawing 13 [a code "000" / the nozzle identifier S2 in (c)] [a code "001" / the nozzle identifier S3 in (d)] [a code "100" / the nozzle identifier S3 in (e)] [the nozzle 2 which detection of an identification code ends and is shown in drawing 13 in this example] when the code "010" is recognized and the detection means 4 detects the end standard child Sb of detection It is checked that the comparison operation was carried out with the identification code which it is distinguished that it is "000001100010" and is beforehand inputted into the control means 6 by the detection object S, the nozzle 2 which judges and wishes for a quality attached, and it has been attached to a shaft 3.

[0090] In addition, even if it is in this example, the standard child Sb is detected first at detection the beginning of the cylindrical shape **** 2b bottom in a nozzle 2. Even if it performs detection of the nozzle identifier S3, S2, and S1 and finally performs the discernment by

detecting the end standard child Sa of detection, of course, the same operation effect is demonstrated by performing electric processing.

[0091] [this nozzle identifier Sn] furthermore, by preparing the portion which does not have a concave and a concave in the perimeter of a nozzle 2 as a many value-ized code, as shown in drawing 16 Identifying of many nozzles 2 becomes possible also for few codes, and the detection object S of the nozzle 2 formed on this same circumference is described.

[0092] The distance P2 during laser radiation is acquired like the nozzle identifier S1, and the end standard child Sa of detection and the end standard child Sb of detection become the standard code of nozzle discernment.

[0093] And by carrying out to rotation of a nozzle 2 in order of the direction of an arrow in drawing 14 with detection of the nozzle identifier S3, S2, and S1, each code is detected and it can set up with "010000001100."

[0094] From this example, at least the identifier formed on the one same circumference can perform coding of 34 = 81 kinds and many nozzles 2.

[0095] Furthermore, a code total is Rn+m when the number of the identifiers on n and the direction of the same circumference is set to m for the number of the identifiers of the lengthwise direction of a nozzle 2 by R many value-ization, and 0 is included. It is.

[0096] Next, the detection object S given to the nozzle 2 which consists of composition shown in drawing 17 - drawing 20 is described.

[0097] At the beginning of detection in this detection object S [the standard child Sa and the end standard child Sb of detection] A part of perimeter part of the nozzle 2 is formed in the shape of [of the predetermined depth which made a part of perimeter part of this nozzle 2 excise in the shape of a straight line] a concave, both the standard child Sa and Sb have the standard child Sa in cylindrical shape **** 2b, and prepare the same form in the Mogami side at nothing and the beginning of detection, and the end standard child Sb of detection is located in the lowest side.

[0098] [the nozzle identifier S1, S2, S3, and S4] [moreover,] As it is prepared in the pitches [bottom / standard child Sa] h and h-- at the beginning of detection and is shown in drawing 18 The concave S1 covering two or more kinds in the cut depth which made a part of real cylindrical part S4 in which a concave is not formed, and perimeter part of the nozzle 2 excise in the shape of a straight line, S2, S3, and S4 are formed in alternation or predetermined arrangement.

[0099] If it is in detection of this detection object S, as shown in drawing 19 , by the detection means 4 [the laser light R from a photogen 15] [with the laser light R which it glares to the concave of these standard child Sa, Sb and the nozzle identifier S1, S2, S3, and S4, and a real cylindrical part, and passed the concave and the laser light R interrupted by cylindrical shape ****] Shadow Ln-- is detected in the light-receiving object 16, the distance Kn to the concave

or the cylindrical shape **** surface from a nozzle center is measured for the radius K0 and the concave depth of a nozzle 2, and this signal is sent to the control means 6, and is recognized as code data.

[0100] In addition, when a nozzle 2 makes one revolution by the pivot means 13, in drawing 19 , the shadow 16a point and 16b point are eternal continuously, but when this change is large, it becomes clear that attachment of the nozzle 2 to the attachment shaft 3 is poor.

[0101] since the distance Kn of each shadow 16a point from the center value of a nozzle 2 and 16b point is detected when the laser light R is applied to each identifier, this nozzle identifier S1, S2, S3, and S4 have a concave -- nothing and the cut depth of that concave are measured.

[0102] When [for example,] drawing 18 is shown in (a) The shadow K3 of the nozzle center and 16a point that the concave which is the nozzle identifier S1 was measured by the laser light R is obtained, and with a code "001" when [moreover,] shown in (b) When the shadow K2 of the nozzle center and 16a point that the concave which is the nozzle identifier S2 was measured by the laser light R is obtained and it indicates it in (c) as a code "010" When the shadow K1 of the nozzle center and 16a point that the concave which is the nozzle identifier S3 was measured by the laser light R is obtained and it indicates it in (d) as a code "100" further Since the laser light R measures the real circle cylinder-axis part which does not have the concave which is the nozzle identifier S4 and the shadow K0 of a nozzle center and 16a point is detected, in a code "000" and the control means 6, it is recognized, respectively.

[0103] Therefore, an operation of the discernment method of the nozzle 2 of the fourth example with the detection object S as shown in drawing 17 in the part wearing equipment A of this invention working example constituted as mentioned above is explained.

[0104] This example makes it go up and down a nozzle 2 with a rise-and-fall means, and rotates a nozzle 2 by the pivot means 13, it is the way with a concave the detection means 4 detects this detection object S for nothing and the depth distance of a concave, and forms the concave depth of a nozzle 2 into many values, and measures that coding.

[0105] In addition, it is in part wearing equipment A, and since the nozzle 2 move operation attached to the attachment shaft 3 of the wearing head 1 is the same as that of the 1-third above mentioned example, explanation of details is omitted.

[0106] First, if distance K2 is measured applying the laser light R to the concave of a nozzle 2, and rotating from the photogen 15 in the detection means 4, as shown in drawing 19 , it will mean detecting the standard child Sa at the beginning of detection, this signal will be sent to the control means 6, and it will be made to recognize as data of a detection start.

[0107] Next, it is what moves a nozzle 2 to the pitches [direction / of a vertical axis] h, and h--, and rotates this nozzle 2, and detects two or more nozzle identifiers S1, S2, S3, and S4 one by one by the laser light R from a photogen 15. as a result, [the nozzle identifier S1 in (a)] as

shown in drawing 18 [a code "001" / the nozzle identifier S2 in (b)] [a code "010" / the nozzle identifier S3 in (c)] [a code "100" / the nozzle identifier S3 in (d)] [the nozzle 2 which detection of an identification code ends and is shown in drawing 17 in this example] when the code "000" is recognized and the detection means 4 detects the end standard child Sb of detection It is checked that the comparison operation was carried out with the identification code which it is distinguished that it is "001010100000" and is beforehand inputted into the control means 6 by the detection object S, the nozzle 2 which judges and wishes for a quality attached, and it has been attached to a shaft 3.

[0108] In addition, even if it is in this example, the standard child Sb is detected first at detection the beginning of the cylindrical shape **** 2b bottom in a nozzle 2. Even if it performs detection of the nozzle identifier S3, S2, and S1 and finally performs the discernment by detecting the end standard child Sa of detection, of course, the same operation effect is demonstrated by performing electric processing.

[0109] [this nozzle identifier Sn] furthermore, by preparing two or more concaves which changed the cut depth of the concave in the perimeter of a nozzle 2 as a many value-ized code, as shown in drawing 20 Identifying of many nozzles 2 becomes possible also for few codes, and the detection object S of the nozzle 2 formed on this same circumference is described.

[0110] If the end standard child Sa of detection and the end standard child Sb of detection measure distance K2, it will mean that they had detected the standard child Sa and the end standard child Sb of detection at the beginning of detection, they will understand the start of recognition, and the end, and will become the standard code of nozzle discernment.

[0111] And by carrying out to rotation of a nozzle 2 in order of the direction of a clockwise rotation in drawing 20 with detection of the nozzle identifier S3, S2, and S1, each code is detected and it can set up with "010001010100."

[0112] From this example, at least the identifier formed on the one same circumference can perform coding of 34 = 81 kinds and many nozzles 2.

[0113] Furthermore, a code total is Rn+m when the number of the identifiers on n and the direction of the same circumference is set to m for the number of the identifiers of the lengthwise direction of a nozzle 2 by R many value-ization, and 0 is included. It is.

[0114]

[Effect of the Invention] As mentioned above, this invention can identify the nozzle of the a large number kind by the detection means using the laser light R easily by giving easy and inexpensive processing which prepares the detection object for discernment search in a nozzle.

[0115] Since the standard child of the end of a detection start / detection for nozzle discernment is prepared in the both sides of the identifier, these standard children can be

detected, the coded identifier which has been arranged by regular intervals or non-regular intervals to this standard child can be detected correctly, and a nozzle can be identified in the detected code.

[0116] By preparing two or more places in the direction of the circumference, the nozzle identifier of a detection object increases the number of codes which can be recognized as much as possible, and can give many information, and the discernment of many nozzles of it is attained. The exceptional effect of ** is done so.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the top view of an outline showing the working example of the part wearing equipment about this invention.

[Drawing 2] It is the front view of an important section showing the outline of the wearing head in drawing 1 .

[Drawing 3] It is the front view of an important section showing the detection object of the nozzle of the first example in drawing 1 .

[Drawing 4] It is the front view of an important section showing other working examples of the detection object of the nozzle in drawing 1 .

[Drawing 5] It is the front view of an important section showing the working example of further others of the detection object of the nozzle in drawing 1 .

[Drawing 6] It is the front view of an important section showing other detection objects of the nozzle of the first example in drawing 1 .

[Drawing 7] It is the explanatory view showing the detection state of the detection object in drawing 3 .

[Drawing 8] It is the front view of an important section showing the detection object of further others of the nozzle of the first example in drawing 1 .

[Drawing 9] It is the front view of an important section showing the detection object of the nozzle of the second example in drawing 1 .

[Drawing 10] It is the explanatory view showing the detection state of the detection object in drawing 9 .

[Drawing 11] It is the explanatory view showing each example of the identifier of the detection object in drawing 9 .

[Drawing 12] It is the explanatory view showing the identifier of the detection object in drawing 9 .

[Drawing 13] It is the front view of an important section showing the detection object of the nozzle of the third example in drawing 1 .

[Drawing 14] It is the explanatory view showing the detection state of the detection object in drawing 13 .

[Drawing 15] It is the explanatory view showing each example of the identifier of the detection object in drawing 13 .

[Drawing 16] It is the explanatory view showing the example of further others of the identifier of the detection object in drawing 13 .

[Drawing 17] It is the front view of an important section showing the detection object of the nozzle of the fourth example in drawing 1 .

[Drawing 18] It is the explanatory view showing the detection state of the identifier of the detection object in drawing 17 .

[Drawing 19] It is the explanatory view showing the detection condition of the standard child of the detection object in drawing 17 .

[Drawing 20] It is the explanatory view showing the example of further others of the identifier of the detection object in drawing 17 .

[Explanations of letters or numerals]

1 Wearing Head

2 Nozzle

3 Attachment Shaft

4 Detection Means

5 Detection Object

6 Control Means

7 Body

15 Photogen

16 Light-receiving Object

Sa Start standard child of detection

Sb The end standard child of detection

Sn Two or more nozzle standard children

[Translation done.]